The Effects of Practice Upon Two Mental Tests

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The success of psychological tests, as they are beginning to be used in practical ways to determine the intellectual capacities of a man, depends to some extent upon whether those tests can be trained for or not. If they can be trained or coached for, their usefulness in many or most channels will, obviously, be very seriously impaired. Psychological examination has made tremendous strides in the last ten years in the devising of tests, but the present need is for their more critical evaluation, and to-day there is becoming more and more apparent the necessity for some answer to the problem above. Put more precisely, it is a question as to whether any of the psychological tests are subject to training, and if so, which, and to what extent? Many tests published are held to be independent of previous experience of the subjects, but exact experimental work along this line is only being begun. The general method is comparatively simple: let the proper subjects be given the test in question for a series of sittings, with or without instructions, and then measure their achievements for the series of sittings or for the last few as compared with the first few. The writer is communicating two experiments of this general type.

THE SENTENCE-FORMATION TEST.

Ross Hartman and J. F. Dashiell.

This experiment was made to determine what effect training may have upon the Sentence-Formation test, Masselon Method.[2] Blank sheets of paper, having the three words from which sentences were to be constructed typewritten at the top of the page, were given to the subjects,—all summer session students of college grade. They were asked to write as many sentences as possible including these three words, within five minutes, the stop signal to be given by the experimenter. If nouns were given, they were to be used only as nouns, and not as verbs, and any form of the nouns could be used. In the

[1]These experiments were conducted in the Oberlin College laboratory.

[2]Described by G. M. WHIPPLE. *Manual of Mental and Physical Tests.* Baltimore, 1915, p. 627.

case of verbs, only verb forms could be used, but the verbs could be used in any tense or other verb form. The subjects were told that the sentences would be graded upon number of sentences written as well as upon their literary quality and the variety of ideas. Three sets of nouns and three sets of verbs were given to the subjects at each sitting. Only one sitting was given a day, and thirteen sittings were made in all.

The word lists had been numbered and given with a blind code system, so that the scorers, working at the end of the series, were ignorant of the order in which they had been given. When the sentences were graded, it was found that there was practically no effect of training, either in the number of sentences written at each day's work or in the quality of the sentences. To get more accurate estimates of each subject's qualitative work the sentences were graded by two people: the instructor (D) and a Senior student who conducted much of the experiment (H). D and H worked independently and each kept his scores to himself until the work was complete. D read the papers in one order, according to the blind code, H read them in the opposite order. Grades ranged from 0 to 5, and the following scale was used as an aid in grading the sentences.

5—sentence full and complete; quality of the best; situation fully described; not hackneyed nor prosaic.

4—a good sentence; situation definite; somewhat poorer than one whose grade is 5.

3—a simple sentence; grammatical errors; mechanical; literal.

2—marked error in construction; loosely organized; two independent clauses; ludicrous or absurd; situation not clear; inaccurate use of words.

1—omission of word; word used in the wrong sense; non-sensical quality of sentence.

In the interests of accuracy, decimal gradations between these scores were used. An amount up to 1 was deducted from the average grade of a paper for lack of variety of thought in the different sentences.

The averages for each sitting are given below, as found by each scorer:

TABLE I

SHOWING THE DAILY AVERAGES IN QUALITY AND QUANTITY OF WORK DONE, AS REPORTED BY THE TWO SCORERS

Sitting	1	2	3	4	5	6	7	8	9	10	11	12	13
Number, ...	4.29	3.79	4.00	4.30	3.74	4.08	4.72	4.51	4.77	4.46	4.43	4.44	4.75
Quality (H) ...	3.51	3.28	3.57	3.52	3.53	3.31	3.57	3.74	3.46	3.36	3.51	3.33	3.68
Quality (D) ...	3.10	3.25	3.31	3.07	3.16	3.25	3.15	3.09	3.23	3.16	3.17	2.95	3.16

It may be seen that, for the group as a whole, there is qualitatively a difference of 12.2% according to one scorer and a difference of 14.3% according to the other; according to one, the best work was done on the third day, and according to the other, on the eighth day; as to the poorest work, one judges it to be on the twelfth day, the other on the second day; as to the average number of sentences written each trial, the best work was on the ninth day and the poorest on the fifth day.

Thus the differences in the numbers of sentences written and the quality of the work are not consistent and progressive differences; they are probably due largely to the differences in the words given: their difficulty, the students' familiarity with them, and so forth. Of course, there are always those elements of the subject's mood, physical and mental condition, interest, etc., which may be of large consequence in this experiment.

It may be thought at first that this lack of improvement shown for the subjects may be due to inefficient scoring methods, that they did not bring to light what differences were present and hence made the various days' results seem more alike than they really were. It remains, then, to show how nearly the graders' scores measure the actual quality of the work done. After ranking each subject according to his ability, as reported by each scorer. it was found that the correlation between the ranking given by one scorer and that given by the other scorer was 0.809, using Spearman's 'Foot-Rule' formula for correlation. Below are given the scores of the two judges reduced to relative positions. For each sitting the rankings on the left are those found by H, those on the right are those by D. These facts speak for the adequacy of the scoring methods: (a) each scorer found definite individual differences at each sitting; (b) each scorer found these individual differences to be fairly persistent thruout the thirteen sittings; (c) the correlation between

TABLE II

SHOWING THE RANKS OF INDIVIDUALS FOR EACH TRIAL

Subject	Trials 1	2	3	4	5	6	7	8	9	10	11	12	13	Totals Trials 3 to 13	Ranks Trials 3 to 13
Ha	3 1	1 1	1 4	6 1	1 4	1 2	1 1	2 1	2 3	1 1	1 1	1 2	1 1	18 21	1 2
Ho	6 6	7 7	8 8	4½ 5	7 6	5 4	5½ 4	8 7	8 8	5 6	5½ 6	3 6	7 6	66½ 66	7 6
J	4 4	5 6	6 7	3 8	4 7	3½ 8	5½ 6	7 6	5½ 6	7 7	7 5	5½ 7	5 7	59 74	6 7
Lh	Abs.	Abs.	2 1	1 2	2½ 1	2 1	2 2	1 2	1 1	2 2	3½ 2	2 1	3 4	22 19	2 1
Lw	1 2	3 2	4 3	4½ 6	5 3	8 6	4 5	3 4	5½ 4	3 4	2 3	7 3½	2 3	48 44½	4 4
P	2 3	6 5	5 6	7 4	2½ 5	6 5	7 7	5 5	3 5	4 5	8 7	4 5	6 5	57½ 59	5 5
S	5 5	4 4	7 5	8 7	8 8	7 7	8 8	6 8	7 7	8 8	5½ 8	8 8	8 8	80½ 82	8 8
Z	Abs.	2 3	3 2	2 3	6 2	3½ 3	3 3	4 3	4 2	6 3	3½ 4	5½ 3½	4 2	44½ 30½	3 3

the rankings assigned by the two independent scorers is, as given above, high.

It is of interest on its own account that, according to the grades given by each scorer, individual differences are found to be permanent.

Finally, it is to be borne in mind that the results shown here are for adults of college age.

The Free Association Test—Continuous Method

W. H. Lehmann and J. F. Dashiell

The work of Wells[3] on free association by the discrete method, or the method of taking one response word to each given stimulus word, has shown that this form of test is definitely subject to practice effects. He found that practice: decreases association time to a limit of nearly 6/5 of a second; differentiates and particularizes responses, and increases readiness of whole vocabulary; makes responses more superficial; decreases the emotive aspect of the test.

It was the aim of the present study to see whether practice in another variety of association test would also show definite effects upon subjects' abilities therein. The one chosen was the continuous or chain method of free association. Each subject was told that a simple noun would be pronounced and that as soon as this noun was given he was to give orally as many nouns as he could think of until told to stop. The time allowed was thirty seconds. 90 words (simple nouns) were divided into 18 sets of 5 words each, two sets being given each sitting for nine daily sittings, and then the first

[3]F. L. Wells. *Practice Effects in Free Association. American Journal of Psychology, 22,* 1-13.

and second sets being repeated for the 19th and 20th sittings on the tenth day. These two sets are given here as samples of the whole series: (1) bell, street, newspaper, fire, dress; (2) pin, snake, tree, ice, dime.

The subjects used were:

N, a boy, 9 years old;
A, a boy, 12 years old;
H, a man, 29 years old;
F, a man, 26 years old.

They were all apparently of normal intelligence.

The effect of practice upon the number of words given by each subject in the allowed time is most easily shown graphically (Figure 1). The work of the two adults, H and F, varied but little within the twenty series, one (F) improving somewhat, the other (H) actually showing loss. In the case of F, the increase in number of words given was not correlated with any measurable improvement in fertility, variety, or other qualitative characteristic; it was correlated, however, with an observable development of control over a general restlessness and "fidgetiness." H was found in other later experiments to be a rather poor subject for prolonged experimentation because of a lack of persistent interest; and in the present study this characteristic is probably partly responsible for his record. The apparent nature of his associative connections between successive words was not changed.

The work of the two boys, N and A, sohws, by contrast, definite improvement. A descriptive analysis here brings an interesting fact or two to light. N on the 19th and 20th trials or sets, as compared with the 1st and 2nd, shows a far greater tendency to give merely verbal and stereotyped responses, repeating a word sometimes within one list of responses given, and frequently using over again in successive lists a whole series of easy words. This is especially true of certain color names. (Cf. Table 3.) In the case of N, then, the definite increase in number of words given in 30 seconds resulting from the practice allowed is attributable largely to his hitting upon the device of using over and over again a group of stereotyped responses (in irregular order). In this connection it should be mentioned that N paid slight attention to the exact stimulus word given him, often using it merely as a signal to start.

TABLE III

SHOWING THE NUMBER OF OCCURRENCES OF CERTAIN COLOR NAMES WITHIN THE TEN RESPONSE-LISTS OF TRIALS 19 AND 20. SUBJECT N.

Stimulus	Total Number Words Given	Orange	Blue	White	Yellow	Pink	Black	Red	Green
"bell"	23	2	2	2	1		2		
"street"	15	1					1		
"newspaper" .	17	2	2	1	1	2			
"fire"	14	1	1	1	1	1	1		
"dress'	21	1	2	2	1	2		1	
"pin"	16	1							1
"snake"	18	2	2			1			
"tree"	23	1	1	2	1	1		1	1
"ice"	20	1	1	1		1		2	
"dime"	10								

With the boy A, a different qualitative result was obtained. In the first two trials or sets of words the responses were all simple words taken from his more immediate environment; whereas in the last two trials the responses to the same stimulus words show much greater variety and range of thought-context.

To summarize: this preliminary experiment seems to show for boys definite effects from practice upon the free continuous association test, but for adults equivocal results.

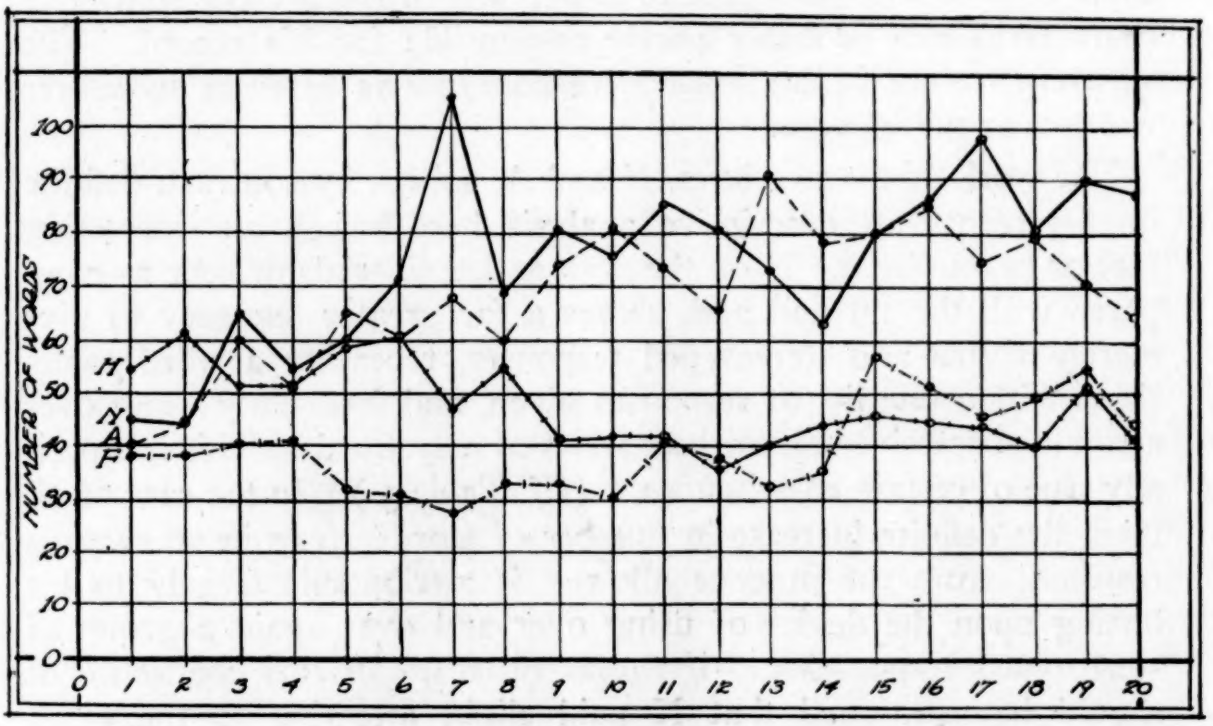

FIGURE 1

The Adolescent Will-Profile

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In the following report a presentation will be made (1) of the main points of difference between the median will-profile of a group of twenty-one high school freshmen and that of normal adults, and (2) of the differences in temperamental pattern found within the high school group itself.

In introduction it may be stated briefly that the will-profile[1] is a presentation by means of a graph of the scores from 1 to 10 received by an examinee on a series of ten tests (later increases to twelve) designed to throw into the foreground a number of character or temperamental traits. The norms were obtained from a ten-percentile grouping of results gained from examination of approximately 250 adults, ranging in age from seventeen to about fifty-five years. The comparison suggested above was instituted in order to determine the effect of maturity on the norms that had been established. But the results proved enlightening in other respects also, since they not only served to point out the ways in which the group in question varied in profile from the grown-up group but also indicated a method for profitable differentiation of the members of the group.

The ten traits measured were the following: Speed of Movement, (measured by writing-rapidity); Absence of Load or Inertia, (measured by the ratio of normal to speeded writing); Flexibility, (measured by success in disguising one's hand and by rapidity and skill in imitation of another hand); Speed of decision, (measured by the time taken in checking a list of character traits); Motor Impulsion, (measured by increase or decrease in graphic amplitude under distraction of attention); Assurance, (measured by reaction to contradiction); Resistance, (measured by reaction to opposition —writing is blocked by introduction of an obstacle); Motor Inhibition, (measured by the length of time that may be consumed in the writing of a given phrase); Care for Detail, (measured by the

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[1]For a detailed report, see *The Will-Profile, A Tentative Scale for Measurement of the Volitional Patttern.* Bull. 3, Department of Psychol., University of Wyoming, 1919.

time and care given to the imitation of graphic models); Coordination of Impulses, (measured by degree of success in fulfilling a double task, namely, writing in speeded time a given phrase on a short line). The two traits added to the list after the group to be reported on had been tested are Perseverence, (measured by the length of time spent in working out a disguised hand); and Revision, (measured by length of time spent in rechecking the list of character traits).

It is evident that the twelve traits listed fall roughly into three groups, of four traits each. The first group of traits (speed of movement, absence of load, flexibility, and speed of decision) emphasizes ease and fluency of reaction. The second group of traits (motor impulsion, assurance, resistance, and motor inhibition) emphasizes force of reaction. The third group (care for detail, coordination of impulses, perseverance, and revision) emphasizes precision and carefulness of reaction.

What degree of correlation will be found to exist between any trait and any other has not yet been accurately determined. There is, however, evidence of correlation of speed of movement and speed of decision; speed of decision and absence of load; flexibility and coordination of impulses. Detailed study of correlations may, in fact, suggest in the final revision a slightly different grouping of traits or it may prove of value in the establishing of subgroups within the main groups. It is possible, for example, that motor inhibition belongs with the last group of traits rather than with the central group, and that coordination of impulses is more closely related to flexibility than it is to care for detail.

In any case, study of actual graphs suggests a number of characteristic patterns. Three one-peaked patterns are possible; three two-peaked patterns; and, besides, a pattern that keeps fairly well to a given level. Fluctuating combinations are also found. The total score is of interest because indicative to some extent of the general level at which the pattern runs.

A one-peaked pattern occurs when relatively high scores are obtained for any one of the three groups of traits. Specifically. there may be three of these one-peaked patterns as follows: (a) an emphasis of the first four traits, indicative of a flexible ready type of reaction; (b) emphasis of the second group of traits, suggesting an aggressive vigorous type of reaction,—the will-ful type; (c)

emphasis of the last four traits indicative of a pondering deliberate type of reaction. Many profiles are two-peaked. High scores on the first group of traits (speed of movement, flexibility, absence of load, and speed of decision) may be combined with a high score on the aggressive traits (motor impulsion, assurance, resistance, motor inhibition), or the combination may be one of the aggressive traits with those that make for a deliberate stable reaction. Occasionally, one finds a pattern that runs high for speed and flexibility of reaction and also for care for detail and coordination of impulses, but with low scores for the more aggressive traits. When the graph maintains a fairly constant level it would seem indicative of a balanced pattern.

In instituting a comparison between the high school and the adult group, I plotted a profile, using as a score for each trait the median score for the high school group. (See Profile I.[2]) It will be seen that the medians for this group of twenty-one high school freshmen coincided with those of the adult group for the following traits: absence of load, speed of decision, motor impulsion, assurance, and resistance. The median score was low for the following traits: speed of movement, flexibility, motor inhibition, care for detail, and coordination of impulses. The pattern as a whole is that of the willful or aggressive type, with a partial emphasis of the first group of traits or those which relate to speed and fluency of reaction. The general form of the profile is of great interest since it exhibits the temperamental type with which the educator deals in his work with the high school freshman. Out of this specific combination of traits, such, for example, as high motor impulsion and deficient motor inhibition arise many of the disciplinary problems of this period.

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[2]With such a small group as the one with which we are dealing the propriety of utilizing the median in the way suggested may be questioned. But observation of the whole distribution of scores confirms our conclusions except, possibly, for three traits.

In every instance in which the group median of the high school pupils is definitely below the median for adult scores the range of scores is considerably cut at the higher end, that is, none of the group achieve the higher scores; usually, too, the mode is the same as the median, although this does not hold true in the case of care for detail. Where the median coincides with that of the adult scores, the distribution is fairly symmetrical except for motor impulsion and assurance. A bigger group is perhaps necessary for definite establishment of the central tendency.

But within the group itself several patterns may be differentiated. These individual profiles, by assisting in the analysis of individual differences, may be utilized in educational guidance in a most instructive way.

Incidentally, the plotting of these profiles, furnished in itself proof of the validity of the scale utilized in getting them.

Let us consider the group of high school freshmen in some detail. In chronological age, they ranged from thirteen years two months to fifteen eleven. The range in mental age was from thirteen years to some seventeen years. The I. Q.'s ran from .87 to 1.36. In addition to this information I had at my disposal for twenty pupils an order of merit based upon grades received in school work, and three arrangements for general intelligence made respectively by the high school instructors in science, modern languages, and mathematics.[3]

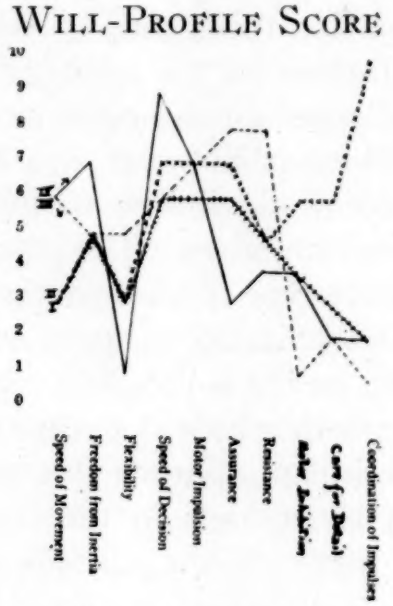

Plate I. Profile I. Red Median for high school group. Total score, 43.
Profile II. Boy, highest total score of group, 60.
Profile III. Girl, total score, 48.
Profile IV. Boy, total score, 44.

Plate I gives, in addition to the Profile for the median score of the group, three other profiles representing the scores made by three different students, whose records are selected for discussion

[3]Mr. Merton Willer, formerly instructor in mathematics in the University of Wyoming Training High School, furnished me with my accessory data, and in a number of cases with the I.Q. record. Before referring to the tables submitted by him I plotted the will profiles and in many cases made prophesies which were confirmed by the records at my disposal.

for very specific reasons. Let us first consider the profile (II) of the boy who gave the highest general score on the profile as a whole. This score totals 60; a much higher score than the median total, which is 43. On the face of the returns we have then a boy of more than average will-capacity. Specifically, he approximates the average of his group in speed of movement, absence of load, flexibility, and resistance; in every other trait he scores above the group-median. His relatively high scores are, however, at the extreme end of the graph. He excels, that is, in motor inhibition, care for detail, and coordination of impulses. This gives us a picture of a careful, dependable boy of great self-control. Let us now turn to the report on his case. So far as his I. Q. (1.09) is concerned he ranks ninth in the group of twenty; his grades entitle him to second place; his teachers agree in placing him sixth in the group. One's anticipations are confirmed. Such a student, because of his industry and volitional force, will accomplish more than can be accounted for on the basis of his general intelligence. He is the type of person who will put to use every atom of ability he possesses and will ultimately outdistance competitors of considerably more capacity so far as bare intelligence is concerned.

Profile III is obtained from another student—a girl this time—who also ranks higher relatively on the will-profile than in general intelligence. Her I. Q. of 1.02 gives her twelfth place in the group; her total score on the will-profile, 48, gives her a position of 7.5 for this ranking. Her pattern, however, is very different from the one just described as can be readily seen from a study of the graph. In speed and fluency of reaction this girl equals or exceeds the median of the group; and in motor impulsion, assurance, and resistance gives very high scores; but her record falls very low for motor inhibition, care for detail, and coordination of impulses. The picture this time is of a wilful determined type, lacking in control and stability. It is not surprising then to find her ranking fifteen for grades. Nor is it unexpected to find considerable difference of opinion in the ranking by teachers. The teacher of science gives her a rank of 7.5; the teacher of mathematics, a rank of 14; and the teacher of languages the same. An interesting bit of additional information should be added; the wilful nature of the girl makes her something of a problem in the home.

Profile IV affords another picture still. The high scores here are

for speed of movement and of decision, and for absence of load and motor impulsion. The scores on assurance and resistance are, qualitatively, those obtained by tactfulness and suggestibility of reaction. The impression received is that of a quick-reacting, animated, and impulsive but not forceful individual. Analyzing this profile I wrote, "With good intelligence this subject should make a good impression; with poor intelligence he will appear flighty and unreliable." Recourse to the tables confirmed my expectations. Since his I. Q. proved to be high, 1.13, I anticipated a favorable judgment of his intelligence on the part of his instructors. Two rank him 4.5; the other, 5.5. The rating otherwise is follows: I. Q. rank, 7; Will-profile rank, 12; rank for grades, 5. I suspect, although I have no reason other than my analysis of the general situation, that in this particular instance high grades might be determined as much by the general impression of intelligent assimilation as by actual work done. In my study of the will-profiles of adults I have a number of clear-cut instances of a comparable pattern producing a generally favorable impression, at times certainly in excess of what would be warranted by actual intelligence. The high points in such a pattern fall at speed of movement and of decision, absence of load, motor impulsion, and, usually, flexibility, in combination with a tactful reaction to the contradiction test.

The above analyses are probably sufficient to show the uses to which the Will-Profile may be put. In further illustration I may give the profile of the child with the highest I. Q., who is chronologically the youngest and mentally the oldest of the group. Her total score on will traits is 55, considerably above the group median. Her grades place her first in the group and in the opinion of the instructors in science and mathematics she has the highest general intelligence of the class. Her instructor in French places her second. Plate II, Profile V, shows her pattern of reaction. She belongs to the quick-reacting aggressive type. At present she is below the median of the group for power of motor inhibition and in care for detail. If mental maturity, rather than chronological age be considered, she is definitely short on these traits. She is, in fact, an excitable, nervous, very charming girl, with a slight speech defect. Her training should seek to develop calm and poise.

On the same plate is plotted the will-profile (VI) of the member of the class with the lowest I. Q. (.87). Mentally he does not quite

make thirteen years. His grades give him eighteenth position among the twenty. His science teacher ranks him sixteenth in the group, but the other two instructors place at the end or next to it. Apparently he is utilizing what capacity he has, since he is more than holding his own against his neighbors in the group who rank quite a little higher in general intelligence. His profile indicates a slow-reacting but tenacious temperament which may bring him a measure of success if he decides upon the right sort of life work and is given careful training for it.

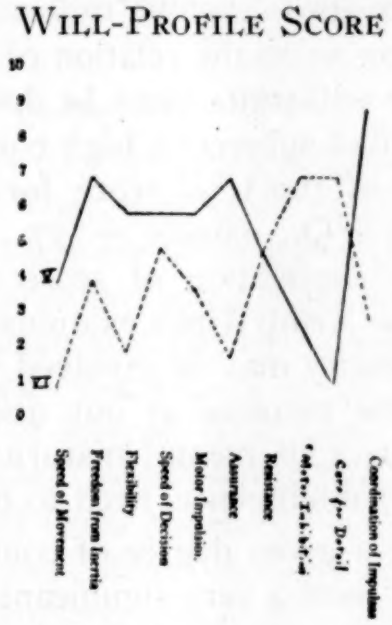

Plate II. Profile V. Girl, chronologically youngest, mentally oldest of group. Total will-score, 55.
Profile VI. Boy, lowest I.Q. of group. Total will-score, 37.

The general effect of the temperamental or will pattern on the grades received in school would be largely determined by the specific form of the pattern. Great care for detail and power of motor inhibition might be expected to issue in high grades. An hair-trigger organization might give a contrary effect. In this group of high school students the correlation of I. Q.'s and grades was +.84; of Will scores and grades, +.72. With one exception. the individual school records are illuminated by a study of the will-profile in conjunction with the I. Q. In this particular case a normal I. Q. and a fair will-profile fail to explain the boy's somewhat checkered school career. Possibly, the home-environment is the factor at fault.

The specific influence of age and intelligence on the will-profile remains yet to be determined precisely. As we have seen, maturity

as exhibited by adults in contrast to high school freshmen is certainly influential in raising the scores on such traits as speed of movement, motor inhibition, flexibility, care for detail, and coordination of impulses. But not only the chronological, but the mental age also, may be influential in determining scores. To estimate the effect of mental age in contrast to chronological, a detailed study should be made for groups (a) of the same chronological age but of different mental ages; and (b) of the same mental age but of different chronological ages. At present, I do not have sufficient material for instituting such a comparison.

The general question as to the relation of general intelligence to the total score on the will-traits must be disposed of briefly. With this group of high school subjects a high correlation is found for a ranking on the basis of the total score for the will-profile and a ranking based on the I. Q., namely $+.77$. But with a group of college girls no such correlation of score on the will-traits and total points made in the Army Alpha examination was found. Some complication with maturity may be involved which it is not possible to disentangle with the material at our disposal. Quite possibly mental age, as indicative of mental maturity, and mental age, as indicative of degree of intelligence, need to be differentiated.

On the whole, after a given degree of comprehension is reached, intelligence would not seem a very significant factor in the will test. Below a certain point, slowness in comprehension might retard the checking of character traits and make it difficult for the subject to understand what is required in a handwriting disguise. But these tests are exceptions. A fair total score on the Will-Profile may be obtained even from feebleminded subjects.

COMMUNICATIONS AND DISCUSSIONS

CLASSIFICATION OF JUNIOR HIGH SCHOOL PUPILS BY THE OTIS SCALE

UNLESS subject matter is adapted to the mental ability or learning capacity of pupils, it can have very little educative value for these pupils. If classes are not classified according to their mental ability it is practically impossible to present subject matter in such a way that the majority of the class may grasp it. In the average recitation there can be found three and perhaps four distinct groups of pupils.

Otis describes three groups:

First, there are those to whom the conduct of the recitation seems fairly well adapted. They give good attention and learn moderately well. Second, there are the pupils who do not seem to be able to keep up with the discussion; when questioned they show difficulty in grasping the fundamental points of the lesson. Such pupils, indeed, may have "passed" in the work of the previous grade. Very likely they show lack of interest because of lack of understanding, and often give up trying to follow. They then either fall into a sort of dreamy state or listen hopelessly while the discussion passes entirely over their heads. Subsequent individual instruction is often necessary to enable them to continue with the subject. Third, there are the pupils who understand the teacher's first explanations. Often they are not given an immediate opportunity for self-expression, but are compelled to listen quietly while a second or third detailed explanation is given for the benefit of the less intelligent pupils. These pupils then either sit in a state of greater or less boredom or cast about for some mischief in which to expend their surplus energies.

It is becoming a well-recognized fact that a pupil who falls in the first group in one subject tends to fall in the group in all subjects, and that the same is true of pupils falling in the second or third groups. There may be, here and there, marked exceptions to the rule, but it is true in general. One is naturally led to the conclusion, therefore, that the pupils of the second type mentioned simply lack the general mental capacity to assimilate knowledge as rapidly

as the other pupils, though their having passed the grade below would seem to indicate that if given sufficient time they could understand the subjects under discussion, at least fairly well. One is led to conclude also that the pupils of the third type mentioned possess a degree of native mental ability which enables them to acquire knowledge more rapidly than do their fellows.

This being the case, if it is possible to teach the "bright" pupils separately, so that they might progress as rapidly and to as great a degree of achievement as their capabilities would permit, then a great injustice is done them by holding them to the lockstep of the middle group. It is to these exceptional children that the nation must look for the creative genius and leadership by means of which society may evolve a greater civilization. Similarly, if the "dull" pupils could be taught separately at a slower rate of progress, which would permit them to keep up with the discussions, take an interest in the subjects, and learn all that their capabilities permitted, then, similarly, a great injustice is done these pupils by permitting them to more than waste their time in dragging through what is to them unintelligible discussion and to acquire the "habit of failure." The almost inevitable outcome of such maladjustment in the premature quitting of school and the consequent misfortune of a half-finished education accompanied by a feeling of malevolence toward the school and society.

The writer has given the Otis Scale to 397 junior high school pupils and has classified them in classes according to their I. Q's. The teachers estimate at times played some part in the classification. With some exceptions it looks as if there might be a close correlation between the teachers' estimate and the I. Q's. A study is being made of this problem at the present time.

Otis classifications of I. Q's is as follows:

Above 140 near genius.
120-140 very superior intelligence.
110-120 superior intelligence.
90-110 normal.
80- 90 dull.
70- 80 borderline.
Below 70 feebleminded.

Distribution of I. Q's .....397 cases
Above 140 .....12.5%..... 49 cases
120-140 .....18.7%..... 74 cases
110-120 .....10.8%..... 43 cases
90-110 .....27.2%.....108 cases
80- 90 .....16.8%..... 67 cases
70- 80 ..... 7.8%..... 31 cases
Below 70 .....6.3%..... 25 cases
Percent of cases above Normal 42%.
Percent of cases Normal 27.2%.
Percent of cases above Normal and Normal 69.2%.
Percent of cases below Normal 31%.

The high percent of feeblemindedness is due to the large number of retarded negroes. Fifty-seven negroes are enrolled and seventeen of this number or 29.8% are feebleminded according to the Otis Scale. Eight out of three hundred forty white pupils are feebleminded or 2.3%. In our Junior high school we have three rather distinct groups of pupils. The normal and accelerate group who will very probably continue their education beyond junior and senior high schools. The second group, a large percent in the "dull" classification, have made somewhat normal progress through the elementary school and will very probably stop school before they reach the senior high. The third group are mature pupils, who are retarded three and four years, and have not completed the elementary school, but who have been placed in junior high school and allowed to pursue subjects which their abilities and interests may permit. This accounts for the rather large percent of probable and definite feeblemindedness. With these three groups in Junior high school, classification by the Otis Scale simplifies matters of discipline—subject matter and methods.

Two years comprise our Junior high school course. In the first half of the first year we have ninety-one pupils and these were classified into three classes according to the I. Q's as follows:

Class I —112 to 140 and above .....33 pupils
Class II — 87 to 110 .....32 pupils
Class III—Below 70 to 80 .....26 pupils

In the second half of the first year we have one hundred and six pupils. This group was divided into four classes according to the I. Q's as follows:

Class I —120 to 140 and above .....29 pupils
Class II —100 to 120 .....30 pupils
Class III— 80 to 100 .....27 pupils
Class IV—Below 70 to 80 .....20 pupils

In the first half of the second year we have eighty-four pupils. This group was divided into three classes according to the I. Q's as follows:

Class I —120-140 value .....20 pupils
Class II — 90-120 .....29 pupils
Class III—Below 70 to 85 .....29 pupils

In the second half of the second year we have one hundred sixteen pupils classified according to the I. Q's as follows:

Class I —120 to 140 and above .....29 pupils
Class II —107 to 120 .....29 pupils
Class III— 88 to 105 .....31 pupils
Class IV—Below 70 to 80 .....27 pupils

The point of division between any two groups is arbitrary and is determined largely by the size of the group. There will naturally be some over-lapping between the groups. The writer feels that the distinguishing feature of the Otis Scale is in classifying the normal and lower end of intelligence, the dull, borderline and feeble-minded.

The grouping must be flexible and whenever a pupil does a better piece of work than the standard of his group he is placed in a higher group and likewise when a pupil fails to do the work of his group he is placed in a lower division.

W. D. Armentrout.

Principal, Junior High School,
Lawrence, Kansas.

THE CORRELATION OF GENERAL INTELLIGENCE TESTS AND SCHOOL STANDING

THE following is a report on the results of the Army Alpha test, given approximately a year ago, which may be of some general interest and a possible contribution to the very important problem of correlation between general intelligence and school standing.

The writer gave the Alpha test to juniors and seniors in the Millersville (Pa.) State Normal School and, after dropping those cases having no previous Normal School record, had left 153 individuals (mostly women). The school standing was worked out for each of these individuals and the coefficient of correlation was found between their general intelligence standing and the school standing.

The school standing was obtained by taking the average of the final marks made by each student for one term. It is possible that it would have been better to take the school standing over a longer period of school life, but this was the best we could do at the time Whether this seriously affects our results is a question, though we do not believe that it does. Yet in the absence of any adequate explanation for the very low correlation found, this factor may play some part.

The following quantative results were found:

$r = +.31 \pm .039$ (Pearson's Product-Moment Formula).
Standard Deviation G. I.=28.2.
Standard Deviation S. S.= 6.1.
Mean G. I. score=117.1 Points.
Mean S. S. grade=81.00 (% basis).

The following table shows a rough picture of the distribution of individuals according to their relative places in school and intelligence classes.

INTELLIGENCE STANDING		SCHOLASTIC STANDING			
		A Students	B Students	C Students	D Students
No.	Class	No.	No.	No.	No.
28	A	6	17	5	..
80	B	5	43	29	3
39	C Plus	..	18	19	2
4	C	..	1	3	..

Why we have obtained such a low correlation is difficult to explain. We cannot blame the grading system, for the Normal School upholds a good standard. The fact that the majority of the individuals tested were women may be significant, for the Army tests are tests especially for men. Yet this has been the case in many schools where the tests were given and which reported better correlation. The fact that school standing is based upon one term of school work may have something to do with the results. Again, it might signify some truthfulness to the notion expressed by Stern.* "Complete agreement between school ability and intellectual ability is not to be expected at all, nor even to be desired, because performance in the school depends not only upon intelligence but upon certain other quite different factors." As a matter of fact some investigators find very satisfactory correlation between general intelligence standing and school standing, while others find very low correlation. It is time for a complete summary of all work done as to correlation between general intelligence tests and school standing, for the kind of coefficient of correlation found here is of great significance. The gathering and comparing of this data the writer has started but, as yet, has only made a start. In the data we have, we find most conflicting results.

We believe that the mental tests are by far the best means we have at present for sorting out students and predicting their future. But to say that our tests have decided limitations is to state the obvious. We would like a complete profile of the boy or girl examined. An individual may be extremely lazy, a shirker, and yet be "very superior" in general intelligence. He may have no "stick-to-it-iveness," no ideals, and yet stand high intellectually. The emotional life of the individual is little touched by the tests. The intelligence ratios are subject to change also, as Miss F. Mateer has shown.†

We have, in our limited use of the more prominent mental tests during the last four years, found illustrations of each of these statements. No one would think of branding a child as feeble-minded until many other factors besides the bare intelligence rating had been taken into consideration, as heredity, training, environment, disease history, sense-organ conditions, etc.

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*Psychological Methods of Testing Intelligence.

†*The Diagnostic Fallability of Intelligence Ratios.* Ped. Seminary, Dec. 1918.

We do not wish to magnify exceptional cases nor do we wish to assume a destructive attitude. Only as we recognize these limitations can we remove them. The child or the man is a many-sided creature, and these many aspects must be adequately tapped before our system of tests, mental and physical, can be thought of as in any sense complete. For diagnostic and prognostic purposes the tests have many weak points, undoubtedly, but that they serve a good function now, that they are better than any past hit-and-miss methods of the pedagogue, is beyond question.

E. B. Skaggs.

Asst. in Psychology,
University of Michigan.

A NEW SILENT-READING TEST

A new form of silent reading test has recently been devised at Indiana University by Mrs. S. L. Pressey. The test consists of paragraphs in each of which there is a word which spoils the meaning of the paragraph or makes a false statement (*e. g.* "The men in the shoe factories in the East have been striking for shorter hours, lower wages, and a recognition of their union"); the children are told to cross out, in each paragraph, the wrong word. The development of the test has also involved certain unusual features. In the first place, the scale is being compared with other reading tests by correlation of each test with an independent statement of ability in reading, based on pooled ratings as to reading ability from four teachers for each child in a large Junior high school. Finally, rate score and comprehension score are being combined into a single score in silent reading by means of the partial regression equations of rate score and comprehension score on reading ability, as thus judged. This last step—the scientific combination of the two scores into a single statement—is felt to be a particularly important feature of the work.

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EDITORIAL

IT WAS quite natural that the earlier work in educational measurements should have been with the elementary school subjects. These subjects are simpler and more definite; they lend themselves more readily to analysis; they apply to a larger number of pupils; they came more particularly within the purview of the early school surveys; there was more of a popular demand to determine exactly the results of instruction in this field. And yet just because of the greater freedom allowed pupils in the selection of courses, just because of the difference in standards of attainment in different schools and classes there is the greater need for a thorough and vigorous prosecution of experimental studies in secondary schools. We need scales and standard tests in every high school subject to aid in the administration and supervision of high school work, to help the teacher attain more precise aims in the details of the work, and to give the pupil an objective standard so that he may become more clearly conscious of his strength and

Measurements in High Schools

weakness, and may put the effort where it will be most significant.

There are indications that high school authorities are beginning to realize this need and are taking measures to satisfy it. The recent increase of interest in group tests of intelligence, and the rapid multiplication of these tests have stimulated many high school principals to experiment with them as guides to the classification of first term pupils. Others are trying intelligence tests and tests of various sorts to help in determining whether a given pupil gives promise of success in a given line of study, as foreign languages, for example. But all such pre-determination tests suffer from the lack of adequate measures of success in the subject itself, and from the lack of analysis of the factors that contribute to such success. What is urgently needed at the present time is a series of reliable scales in each secondary school subject to be used in measuring the attainments of pupils at each step of their advancement. Such measures should include both range of information and readiness to meet new situations in the field of the subject.

Much work has been done on English composition and some on English grammar, but the tests and scales in these fields have all been developed from the point of view of the elementary schools. Other scales need to be worked out here in accord with the aims of the high school teacher of English. A scale of familiarity with standard literature is very much to be desired. Excellent work has been done by Rugg, Hotz and others in developing scales for elementary algebra, but there is much need for comparative studies of these scales on the same groups of pupils to determine their relative advantages in point of ease of administration and scoring, diagnostic value for the teacher, and helpfulness for the pupil. There are as yet no scales in plane geometry. The tests of Stockard and Bell, of Minnick, and of Starch contain valuable suggestions, but they still await organization into a usable scale. In foreign languages there has been much activity in the past few years, and we now have some excellent scales in Latin, and some promising preliminary work in French and Spanish. In history Van Wagenen has recently done some good work, but the fields of medieval and modern European history and of English history have not been touched. The whole territory of the sciences is practically unexplored ,and little or nothing has been done in commercial and technical fields. Thus it will be seen that only a beginning has been made in measurements of high schools subjects, and intensive investigations are urgently called for.

J. C. BELL.

NOTES AND NEWS

At the meeting of the New York Society for the Experimental Study of Education, held February 20, the general topic of discussion was "Problems in the Teaching of Modern Languages in High Schools." Mr. M. A. Luria, of DeWitt Clinton High School, recounted his "Experience with Prognosis and Predetermination Tests." "Before any valid prognosis test can be devised there will have to be a breaking up of the aims in modern language instruction, a consideration of the fact that pupils eventually acquire a foreign language in certain phases only, and finally a series of standard tests will have to be perfected which will remove the personal element in determining a pupil's linguistic achievement." Mr. Waldemar Dorfman, Stuyvesant High School, discussed "Recent Psychological Tests in Modern Languages," with especial emphasis on the Briggs-Kelley tests, the Otis tests, the Handschin tests, and the Wilkins tests, as worked out in New York City. Mr. William M. Barlow, Curtis High School, spoke of "Vocabulary Limitations," stressing the difference between active and passive vocabulary, and urging the experimental determination of standard active vocabularies in each language for each term's work. The discussion was summed up by Mr. Lawrence A. Wilkins, director of modern languages in New York City high schools.

The provincial government of the District of Catalonia, in Spain, has invited Dr. Montessori to assume official direction of "scientific puericulture" within its area. She is to be given a free hand in administration and method alike, to be allowed as many years free from interference as she may require, and to have all facilities put at her disposal for any and all lines of research. Both urban and rural conditions will be open to her as a laboratory.

The British prime minister has appointed a committee "to inquire into the position to be assigned to the classics (i. e., to the language, literature and history of ancient Greece and Rome) in the educational system of the United Kingdom, and to advise as to the means by which the proper study of these subjects may be maintained and improved."

At the December meeting of the American Psychological Association a committee was appointed to formulate standards for the qualifications and certification of practicing psychologists for the United States. The committee consists of Professor Bird T. Baldwin, State University of Iowa, chairman; Professor Walter F. Dearborn, Harvard University; Professor Leta S. Hollingworth,

Columbia University; Dr. Helen T. Woolley, Vocational Guidance Bureau, Cincinnati; and Dr. Beardsley Ruml, The Scott Company, Philadelphia. State departments of education contemplating the certifying of psychologists should consult with a member of the committee. New York, Wisconsin, New Jersey and California recently legalized practising psychologists.

Professor C. H. Handschin, of Miami University, Oxford, Ohio, has recently published with the World Book Company a series of modern language tests in French and Spanish. There is a silent reading test, A, in each language, constructed somewhat on the principle of the Kansas silent reading tests in English, all answers to be expressed in words in the foreign language. In each language there is also a connected prose passage, B, the comprehension of which is determined by the answers given to ten English questions, the answers to be given either in the foreign language or in English as the pupil prefers. There is also a French comprehension and grammar test, in which the pupil carefully studies six easy French sentences for five minutes, and is then asked first to reproduce the sentences, and then to give them in the third person plural, past indefinite tense. Methods of scoring and tabulating are carefully indicated.

Professor David Camp Rogers, of Smith College, has issued a 32-page pamphlet containing eleven group tests of intelligence which have been given to 480 girls of the freshman class. The tests are as follows: 1. Logical conclusion test. 2. Delayed recall of the ideas in a passage read at the beginning of the period, in answer to questions asked toward the end of the period. 3. Range of information test. 4. Solution of arithmetical problems. 5. Immediate recall of ideas in a descriptive passage. 6. A digit-letter substitution test. 7. Similar relations test. 8. Completion test. 9. Absurdities test. 10. Following directions test. 11. Train of associations test. The results from these tests should be very interesting.

Dr. W. V. Bingham, chairman of the division of anthropology and psychology of the National Research Council, announces the approaching publication of a series of tables to facilitate the computation of ρ, the coefficient of correlation by the rank order method. These tables have been prepared by the Scott Company Laboratory, Philadelphia, and will be of great value to any student who has many correlation computations to make.

Last fall the War Department entered upon a program of training for the enlisted men of the army including both general education and vocational subjects, and intended to achieve the following purposes: 1. To train technicians and mechanics for the special services of the army, and to raise the general standard of intelligence of the enlisted personnel in order to increase military efficiency. 2. To prepare the men for return to civilian life, upon the termination of their periods of enlistment, with occupational training that will render them economically independent, and with a clear understanding of their social and industrial relationships. The courses of instruction in the army schools are grouped under two main divisions: General education and vocational training. Under the first division are included all of the more important subjects commonly taught in the public elementary and high schools, as reading, spelling, writing, arithmetic, history, geography, and civics. The vocational work is organized under seventeen principal departments, with a total of 116 different branches of instruction now listed. The special service school includes, in addition to the general education and the vocational training sections, a section of tests and standards, whose duties are to develop practical methods for testing the men in the army schools, and to set up standards of progress in the various subjects of training. Specifically, the section of tests and standards aims to perform the following functions: 1. To devise a simple test of literacy for the classification of recruits. 2. To devise tests for the measurement of proficiency in arithmetical operations and in the understanding of language, for purposes of classification and assignment to courses in general educational and vocational training. 3. To devise tests for measuring the degree of trade proficiency of men who claim to have experience in industrial occupations. 4. To devise tests of general mental ability, similar to the Army Intelligence Tests, but more directly adapted to measuring the men now composing the army. 5. To devise uniform methods of measuring the progress of men in the several courses of training. 6. To devise methods of determining as definitely as possible the total amount and quality of the student's performance upon completion of his training, for the purpose of certifying him for industrial employment or for advanced training. The organization of this work is in the hands of Dr. D. Edgar Rice, consulting expert, section of tests and standards.

Dr. Elmer Ernst Southard, Bullard professor of neuropathology at the Harvard Medical School, director of the Boston psychopathic hospital, died from pneumonia in New York City on February 8, at the age of forty-four years.

PUBLICATIONS RECEIVED

J. Remsen Bishop. *Measurement Tests in First-Term Geometry.* First Year-Book, National Association of Secondary School Principals, 1917. Pp. 50-56.

After some sharp criticism of the educational measurement movement, its aims and methods, the author proposes ten questions in plane geometry, and gives the percentage of correct solutions obtained from the boys and girls of his school who had just finished the first term of geometry. The boys averaged 55 per cent., while the girls averaged only 38 per cent. The teachers' marks given to these pupils on their term's work averaged about 48 per cent. The author adds three sets of questions that he thinks will be serviceable both for test and for practice purposes.

Hereward Carrington. *Modern Psychical Phenomena.* New York: Dodd, Mead and Company, 1919. Pp. xv, 331, $2.50.

With the present recrudescence of interest in the occult this book should have a wide appeal. It is vastly better than most books on psychic phenomena, for the author knows psychology and is disposed to explain the alleged phenomena on psychological principles. At the same time he professes to believe in telepathy (though he is unable to say what it is), and asserts roundly that genuine materialization (whatever that may be) is a fact in nature. Part I treats of the relation of physical phenomena to evolution, psychology, biology and ethics; Part II gives an account of recent experiments and theories; and Part III describes researches in crystal vision and crystal gazing.

Arthur Henry Chamberlin and James Franklin Chamberlin. *Thrift and Conservation: How to Teach It.* Philadelphia: J. B. Lippincott Co., 1919. Pp. 272. $1.50.

That there may be universal understanding of what thrift is—personal, community and national—the subject must be taught in the schools. The Committee on Thrift Education of the National Council of Education has been studying the best methods of accomplishing this, and its Chairman. Arthur Henry Chamberlin, now offers this authoritative guide to the educational world. Among the chapter subjects are thrift and the national life, true and false economy, waste, food, dress, time, human resources, increasing the food supply, conserving the soil, the value of forests, our mineral fuels, national health, use and misuse of money, and the use of public property; with subdivisions of important subjects. This is not only an authoritative guide to the teaching of individual and national

thrift, but a book which will appeal through its inherent interest and the skill with which the subject is presented. It is earnestly commended to the educational world.

PADRAIC COLUM. *The Children's Homer: The Adventures of Odysseus and the Tale of Troy.* New York: The Macmillan Company, 1918, Pp. ix, 254. $2.00.

This is the first attempt to combine in one volume the stories of the Odyssey and the Iliad. As is fitting in a Homer intended for young people the work opens with the youth Telemachus who is moved to go in search of his father. He hears from the minstrel of his house and afterwards from Menelaus, Helen and Nestor, the stories of Achilles, Hector and Odysseus. In this way the Iliad is presented. Afterwards the tale is taken up with the adventures of Odysseus on his way back to his own land and the whole of that enchanting narrative is retold. The diction of the narration is simple, direct and dramatic. Padraic Colum makes this Children's Homer at once intimate and spirited. The charm of the tale is greatly enhanced by the splendid drawings of Willy Pogany. There is scarcely a page that does not show the touch of the artist's pencil, and there are eight full page illustrations in color.

A Co-operative Study of Reading in Sixteen Cities of Indiana. By Bureau of Co-operative Research, Indiana University School of Education. Indiana University Studies, No. 37. June, 1918. Pp. 43. Thirty-five cents.

This monograph gives a detailed account of the application of the Gray Oral and Silent Reading Tests to 4,780 pupils in Indiana schools. The tests, directions for use, and methods of scoring are presented in detail, the scores for both oral and silent reading are presented in tabular and graphic form, and there is an elaborate discussion of each set of results. Indiana cities are distinctly below Grand Rapids, Cleveland and St. Louis in oral reading, and are also low in the comprehension of silent reading. There are striking differences between schools.

JOHN J. COSS AND LEONARD OUTHWAITE. *Personnel Management. Topical Outline and Bibliography.* Washington: Adjutant General's Office, 1919. Pp. 59.

This is a valuable bibliography of the rapidly growing literature on the selection of individuals for specific positions. The list of references is by no means complete, but is fairly representative, and is conveniently organized.

LAWRENCE A. WILKINS. *Spanish in the High Schools.* New York: Benjamin H. Sanborn and Company, 1918. Pp. x, 264.

The sub-title to this excellent manual is "A Handbook of Methods, with Special Reference to the Junior High Schools." The opening chapters discuss the increasing demand for Spanish in American education, the aims in teaching Spanish, the present attitude toward Spanish in the schools, and the preparation of the teacher. There follow chapters on methods in teaching the langauge, the course of study for junior high schools and its relation to the work of other schools, the organization of classes, the conduct of the recitation, practical suggestions to the teacher, club work in Spanish, the qualifications and handicaps of the teacher of Spanish, and the value of Spanish as a foundation for the study of Latin. There is an excellent working bibliography for both teachers and pupils. With the extended use of this valuable handbook the teaching of Spanish will rapidly rise from the Cinderella of modern languages to the rank of princess which it may justly claim.

J. HAROLD WILLIAMS. *A Guide to the Grading of Homes.* Whittier State School, Department of Research, Bulletin No. 7, 1918.

Reproduces the author's scale for grading home conditions, gives the record blank used by the Whittier Department of Research, and discusses in detail the points that are apt to arise in the use of the scale.

J. HAROLD WILLIAMS. *The Intelligence of the Delinquent Boy.* Journal of Delinquency, Monograph 1, 1919. Pp. 198.

This excellent monograph presents the results of an intensive study of 470 delinquent boys, most of them at the Whittier State School. They are classified into five groups, superior, average-normal, borderline, and feeble-minded. Over half the boys fall in the last two groups, and only 14 are found in the superior group. This bears out the contention that delinquency and mental deficiency are closely associated in a large proportion of cases. The characteristics of each group are described, and several illustrative cases are recounted in detail. There is also a classification by offenses and by racial differences. There are further chapters on heredity and the home in relation to delinquency. The monograph is of great value for those school people who have to deal with cases of delinquency among pupils.

WESTEL W. WILLOUGHBY. *Prussian Political Philosophy.* New York: D. Appleton and Company, 1918. Pp. xi, 203. $1.50.

This is a clear and dispassionate examination of the political principles which made Germany a menace to democracy wherever that form of government existed. It throws into sharp contrast the two conflicting theories of government, absolute sovereignty on the one hand and the law of the people on the other. The author describes, against the background of a masterly exposition of American political ideals, the development of the Prussian theories and machinery of statecraft, and the means whereby the German political conscience was educated to the acceptance of absolutism as the true expression of sovereignty. An appendix describes the liberalization under the guidance of Prince Maximilian of Baden to which the Imperial autocracy was driven by impending military disaster, and which seems from the recent elections to be regaining the ascendency.

JOHN R. WILSON. *Annual Report of the Board of Education, Paterson, New Jersey, for the Year Ending June 30, 1918.* Paterson: Board of Education, 1919. Pp. 290.

The important part of this report is the account of the surrvey of the Paterson schools under the direction of Professor George D. Strayer and associates from Teachers College, Columbia University. The buildings were scored by the Strayer score card, the light conditions in typical rooms were determined by the illuminometer, and the achievements of the pupils were measured in composition, handwriting, spelling, arithmetic, language and reading. The compositions were measured by the Nassau County Supplement to the Hillegas Scale, and the results are compared with the Trabue standards and the scores from thirteen other cities. On the whole the Paterson scores are somewhat lower than those from other cities. The distribution of the scores by grades will prove helpful to other surveyors. In handwriting the Thorndike scale was used, and again we find the same wealth of detailed information about the distribution the scores. In spelling a selection from the Ayres Scale was used, and not only is there a detailed presentation of the distributions, but also the percentage of accuracy for each grade on each word. In arithmetic the Woody tests, Series B, the Courtis tests, Series B, and the Stone reasoning tests were used, and the results are given with the usual meticulous consideration for details. In reading the Thorndike Scale Alpha 2 was used and in language the Trabue language completion tests. The survey is a model of what such reports may be in the way of helpfulness both to the practical school man and to the scientific investigator.